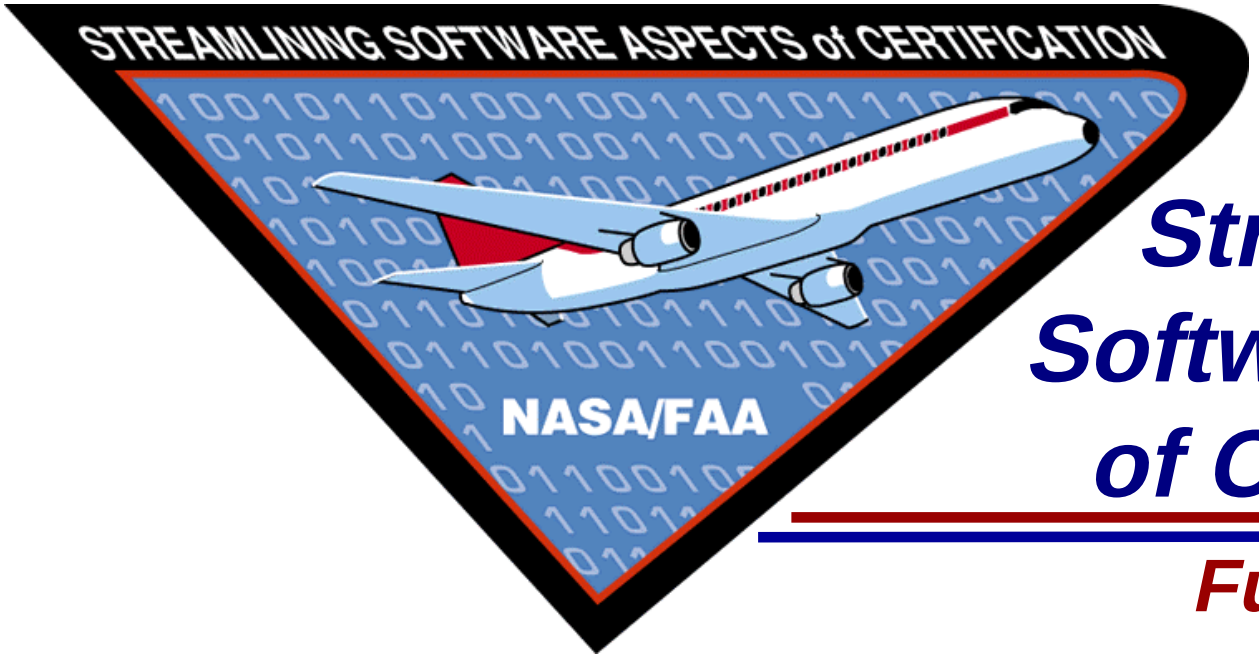

Streamlining Software Aspects of Certification

Future Plans

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Is this the end, the beginning of the end, or just the beginning?

- From the start, program direction has been determined by workshop data
  - data from Workshops I & II plus the Survey have yielded a good look at the industry perspective on cost and schedule issues related to software aspects of certification
- Have we completed our mission yet?

SSAC Program Mission

Reduce the cost and time associated with software aspects of certification for both airborne and ground-based systems while maintaining or improving safety

- To accomplish this, the technical team was tasked to:
  - provide objectively gathered evidence about cost and schedule drivers
  - assess if the cost and time associated with current processes yield the required safety benefit
  - propose and test alternative solutions

Is this the end, the beginning of the end, or just the beginning?

- From the start, program direction has been determined by workshop data
  - data from Workshops I & II + Survey have yielded a good look at the industry perspective on cost and schedule issues related to software aspects of certification
- Have we completed our mission?
  - Have we streamlined anything yet? (I don't want to answer that yet -- just want you to stew on that)
  - Have sufficient data been collected to provide a comprehensive understanding of the cost and schedule drivers such that streamlining efforts may likely be successful?
  - Who makes that decision?

Original Expectation

- At the start of the SSAC program, there was an expectation that cost and schedule drivers came from activities called out in DO-178B that were non-value-added
  - i.e. objectives could be removed from DO-178B without having any negative impact on product safety
    - having fewer objectives to meet would streamline the process
- The majority of concerns expressed at SSAC Workshop I were more related to process issues between the FAA and applicants than to technical aspects of DO-178B
  - so, the nature of what we were looking at, with respect to streamlining, was very different than expected

Fixing Process Problems

- There is a difference between “improving a process” and “streamlining a process”
  - Improving a process -- implies making change to correct some deficiency in the process
    - cost impact is irrelevant
  - Streamlining a process -- implies making change to correct some inefficiency that has led unnecessarily to increased cost or to schedule delay (or some other attribute of importance)
- Most processes can be improved
  - the FAA’s software approval process is no exception
- There is an assumption, as evidenced by initiating the SSAC program, that the software approval process needs streamlining, for cost, as well

Collecting Data

- Not all decisions for making process improvements require the same level of data to justify taking action to make that improvement
- In a lot of cases, process improvements are accomplished through either modification or addition to some current set of working rules
  - for some, this limits freedom or flexibility
  - for others, this helps mitigate misunderstanding/misdirection
- Streamlining, on the other hand, often involves removing barriers (e.g. eliminating non-value-added requirements), increasing flexibility, etc.
  - typically requires more substantial data to justify

Example

- It was clear prior to Workshop II that there were areas (e.g. tool qualification, minor/major software changes) where policy was needed
- Through the breakout sessions in Workshop II, work was started on developing that policy
  - did not need to study the situation further to decide to take action
  - action was taken (doing initial drafts)
  - you have seen the results

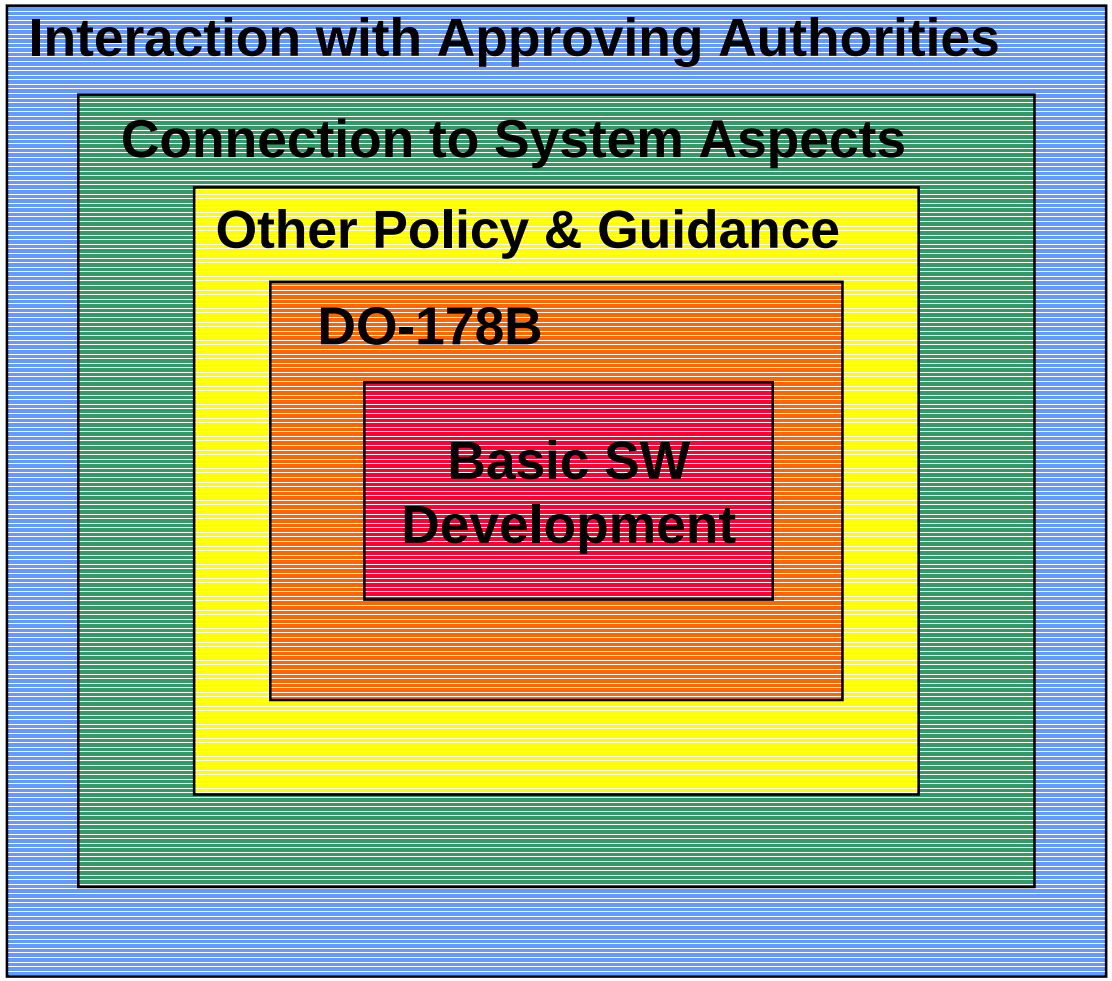
Did that streamline anything?

Did that improve anything?

Importance of Improving & Streamlining

- There is a difference between treating the symptoms of a process that has inefficiencies -- (e.g. putting in policy where there is a hole) -- and fixing the inefficiency in the process itself
  - why was the hole there to begin with?
  - what can be done to make sure all holes are filled and no new ones appear?
- Treating symptoms (filling holes) is important
- The goal of streamlining -- reducing cost and time -- cannot be achieved by only treating the symptoms

Origins of Cost?



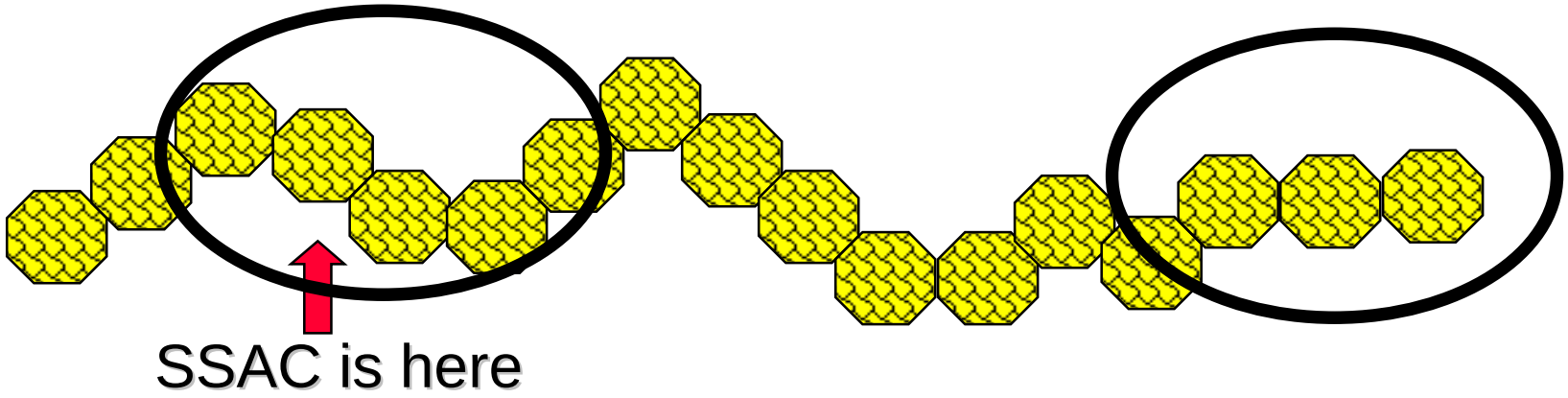
- Need to understand the reality of what is going on in the different aspects of software development and approval

Connection to Data

- Data (not just “expert” opinion) is needed to understand the reality of the software development and approval process
- A lot of what has been done so far through SSAC is to start to understand the reality of the software development and approval process ***from the industry perspective***
  - this has revealed areas for process improvement
  - but is insufficient for uncovering the root causes needed for streamlining
- Need to get the other side of the story -- the FAA perspective

Data Collection Path

- Good data rarely comes all at once
  - gathering data is often neither easy nor cheap
- Good data is most often the result of a sequence of steps
  - where with each step you are refining your data collection such that eventually you can determine the root cause
- We have just taken the first steps down that path of determining root causes -- and we aren't even close to the end yet



Follow On Activities:

Things The SSAC Technical Team Would Like To Pursue

Follow On...

- Document and make available all of the information from the workshop
  - prepare written summary of all breakout sessions
  - make all presentation materials available on the SSAC web site
  - also track follow-up action on the web site
- Refine the concepts developed in the DO-178B Assessment Strategies breakout session
  - Solicit input from DO-178B Assessment Strategies session attendees to help in refinement of concepts and questions
  - Have attendees solicit input from colleagues to help in refinement of concepts and questions

Follow On ...

- Revise the Survey Report based on feedback from the workshop
  - including consideration of any specific comments you have on the survey report
- Publish the final survey report by June 30, 1999
- Pursue further data collection or interaction as requested by the FAA to support preparation of their response
- Conduct a “survey” (similar to the industry survey) to get the FAA perspective on issues in software aspects of certification
  - include specific areas identified from the industry survey
  - e.g. investigate inconsistency issues

Follow On ...

- Pursue data collection necessary to identify root causes of inefficiencies -- so that streamlining can take place
  - Proposal: Careful analysis of select development projects to ascertain where resources are being expended
    - FAA Interaction
    - Technical Resources
    - Timeline

Questions for Industry

- Will industry participate in further data collection?
  - Note: this might include sensitive cost and non-conformance information
- What can/will industry do to support research activities?
  - support of the SSAC program over the past year and a half is one example of support

Follow On Activities:

Industry Input

(Things That Y'all Would Like To See the Technical Team Pursue)

May 27, 1999